

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2004/006362

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl⁷ C12N15/85, 15/53, 9/02, 5/06, C12Q1/02, G01N33/15, 33/48, 33/483, 33/50

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl⁷ C12N15/85, 15/53, 9/02, 5/06, C12Q1/02, G01N33/15, 33/48, 33/483, 33/50

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
MEDLINE (STN), BIOSIS (STN), WPIDS (STN), CAS (STN), JICST FILE (JOIS), SwissProt/PIR/GeneSeq Genbank/EMBL/DDBJ/GeneSeq

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	WO 2003/16839 A2 (XENOGEN CORP.), 27 February, 2003 (27.02.03), Claims: pages 7 to 8, 20 to 28; Figs. 1 to 3 & US 2003/0135871 A1	1-7, 9 1-4, 7, 9, 10-14, 22, 23, 25, 26
X	US 2002/119542 A1 (Vadim R. Viviani), 29 August, 2002 (29.08.02), Abstract; Fig. 2 (Family: none)	5
Y	VIVIANI V.R. et al., "Cloning, sequence analysis, and expression of active Phrixothrix railroad-worms luciferases: relationship between bioluminescence spectra and primary structures", Biochemistry, 1999, Vol.38, No.26, pages 8271 to 8279	1-4, 7, 9, 10-14, 22, 23, 25, 26

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
09 August, 2004 (09.08.04)

Date of mailing of the international search report
24 August, 2004 (24.08.04)

Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Katsuhiro OMIYA et al., "Comparative aspects of a luciferase molecule from the Japanese luminous beetle, <i>Rhagophthalmus ohbai</i> ", Yokosuka-shi Hakukenhō(Shizen) Sci.Rept. Yokosuka City Mus., 2000, No.47, pages 31 to 38	1-4,7,9, 10-14,22,23, 25,26
Y	VIVIANI V. et al., "Thr226 is a key residue for bioluminescence spectra determination in beetle luciferases.", Biochem Biophys Res Commun., 2001, Vol.280, No.5, pages 1286 to 1291	1-4,7,9, 10-14,22,23, 25,26
Y	SUMIYA M. et al., "Cloning and expression of a luciferase from the Japanese luminous beetle <i>Rhagophthalmus ohbai</i> ", Biolumin. Chemilumin., Proc.Int.Symp., 1999, pages 433 to 436	1-4,7,9, 10-14,22,23, 25,26
Y	JP 2002-542791 A (K.R. Leuven Research & Development), 17 December, 2002 (17.12.02), Claims; Par. Nos. [0019], [0034] & WO 2000/065076 A2 & EP 1183381 A2	10
Y	GRENTZMANN G. et al., "A dual-luciferase reporter system for studying recoding signals.", RNA, 1998, Vol.4, No.4, pages 479 to 486	11-14,22,23, 25,26
A	WO 97/24490 A1 (Tropix, Inc.), 10 July, 1997 (10.07.97), & US 66032657 B1 & EP 874913 A1 & JP 2000-513563 A	8,11-27
P,X	Katsuhiro OMIYA, "Hakko Kochu no Seibutsu Hakko Kiko no Kiso to Oyo -Seibutsu Hakko ni yotte Saibo Joho o Saguru-", Seikagaku, The Japanese Biochemical Society Tokyo, 25 January, 2004 (25.01.04), Vol.76, No.1, pages 5 to 15	1-27
P,A	NIEUWENHUIJSEN BW, "A dual luciferase multiplexed high-throughput screening platform for protein-protein interactions.", J.Biomol.Screen., 2003 December, Vol.8, No.6, pages 676-684	8,11-27

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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

The matter common to claims 1-27 is "a photoprotein capable of emitting light whose emission wavelength is substantially not dependent upon determination conditions". However, search has revealed that this common matter is not novel because the reference (WO 2003/16839 A2 (XENOGEN CORPORATION) 2003.02.27) discloses red photoprotein derived from railroad worm, having realized stable expression in mammiferous cells (the photoprotein comprehended in the "photoproteins capable of emitting light whose emission wavelength is substantially not dependent upon determination conditions"). Consequently, this common matter falls within the category of prior art and (continued to extra sheet)

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

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Continuation of Box No.III of continuation of first sheet(2)

hence cannot be "special technical features".

Therefore, the inventions claimed in claims 1-27 are to be classified into four invention groups, namely, the group whose special technical feature resides in "green photoprotein derived from railroad worm, having realized stable expression in mammiferous cells", the group whose special technical feature resides in "green photoprotein derived from Rhagophthalmus ohbai, having realized stable expression in mammiferous cells", the group whose special technical feature resides in "luteofulvous photoprotein derived from Rhagophthalmus ohbai, having realized stable expression in mammiferous cells" and the group whose special technical feature resides in "attaining stable expression of two or more photoprotein genes in mammiferous cells".